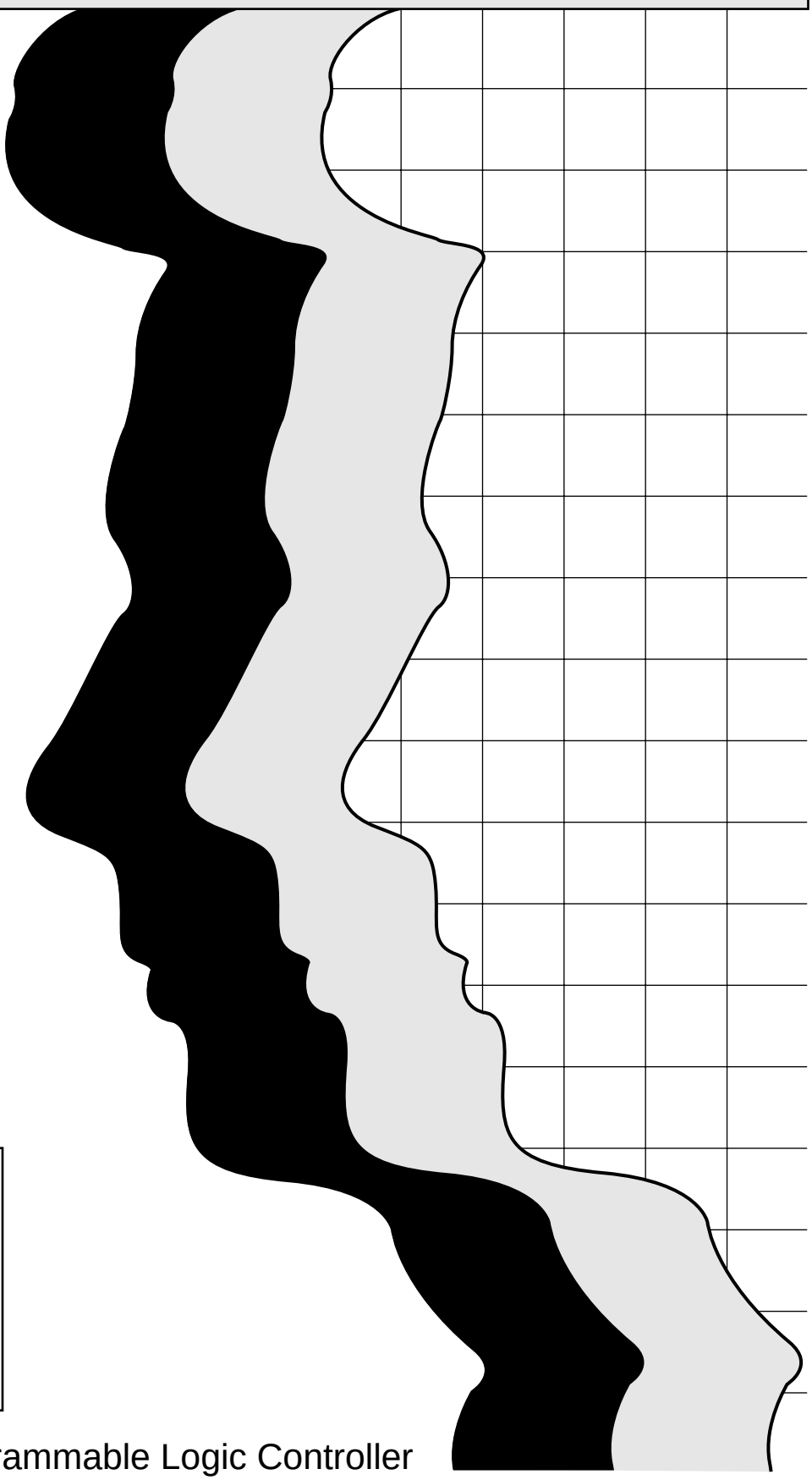
MITSUBISHI

CC-Link Embedded I/O Adapter

User's Manual



MELSEC

Mitsubishi Programmable Logic Controller

• SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product. Refer to the user's manual of the CPU module to use for a description of the PLC system safety precautions.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

⚠ DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design Precautions]

⚠ DANGER

- When there are communication errors with the data link, the communication error station will enter the following condition.
  Build an interlock circuit into the sequence program to operate system safely by using the communication state information.
  An accident may occur by a false output or a malfunction.
  (1) Turn off all input from Remote I/O station.
  (2) Turn off all output from Remote I/O station.
- The output may be left ON or OFF due to trouble in the CC-Link embedded I/O adapter.
  Configure a circuit to monitor I/O signals which may lead to a serious accident..

⚠ CAUTION

- Use the CC-Link embedded I/O adapter in an environment that meets the general specifications contained in this manual.
  Using this adapter in an environment outside the range of the general specifications could result in electric shock, fire, malfunction, and damage to or deterioration of the product.
- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm (3.9 in.) or more from each other.
  Not doing so could result in noise that would cause malfunction.

[Installation Precautions]

⚠ CAUTION

- Do not directly touch the CC-Link embedded I/O adapter's conductive parts.
  Doing so could cause malfunction or failure in the CC-Link embedded I/O adapter.
- Securely solder the CC-Link embedded I/O adapter to install it to a user board.
  Defective contact could cause malfunction.

[Wiring Precautions]

⚠ DANGER

- Before beginning any installation or wiring work, make sure that all phases of the power supply have been obstructed from the outside.
  Failure to completely shut off the power supply phases may cause electric shock and/or damage to the adapter.

⚠ CAUTION

- Always ground the FG terminal to the protective ground conductor.
  Doing so may cause electric shock or malfunction.
- Correctly connect the CC-Link embedded I/O adapter after confirming the rated voltage and pin numbers of the product.
  Failure to do so could make a short circuit with bare solderless terminals.
- When wiring the CC-Link embedded I/O adapter, check the rated voltage and terminal layout and make sure the wiring is done correctly.
  Connecting a power supply that differs from the rated voltage or wiring it incorrectly may cause fire, failure or malfunction.
- Make sure that there are no foreign substances such as sawdust or wiring debris inside the CC-Link embedded I/O adapter.
  Such debris could cause fire, failure or malfunction.
- Make sure that the communication cable connected to the adapter is kept in the duct or fixed with cramps.
  Failure to do so may cause a damage to the user board or cables due to dangling, shifting or inadvertent handling of cables, or misoperation because of bad cable contacts.
- Do not grab on the cable when removing the communication cable connected to the adapter.
  When removing the cable with a connector, hold the connector on the side that is connected to the adapter.
  When removing the cable without a connector, loose the screws on the side that is connected to the adapter.
  Pulling the cable that is still connected to the adapter may cause a damage to the user board or cable, or malfunction due to bad cable contacts.

[Starting and Maintenance Precautions]

⚠ DANGER
• Do not touch the terminals or connector while the power is on. Doing so may cause electric shock or malfunction. • Make sure to switch all phases of the external power supply off before cleaning or re-tightening the terminal screws. Failure to do so may damage the CC-Link embedded I/O adapter or cause malfunction.

⚠ CAUTION
• Do not disassemble or modify the CC-Link embedded I/O adapter. Doing so could cause failure, malfunction, injury or fire. • Because the case of the CC-Link embedded I/O adapter is made of resin, be careful not to drop it or expose it to strong impact. It may damage the CC-Link embedded I/O adapter. • Before mounting or dismounting the user board loaded with the CC-Link embedded I/O adapter to or from an enclosure, always switch power off externally in all phases. Failure to do so may damage the CC-Link embedded I/O adapter or cause malfunction.

[Disposal Precautions]

⚠ CAUTION
• When disposing of this product, treat it as industrial waste.

A - 3

REVISIONS

* The manual number is given on the bottom left of the back cover.

Print Date	* Manual Number	Revision
May., 2002	SH(NA)-080324E-A	First printing
Aug., 2002	SH(NA)-080324E-B	Addition Section 4.1.2, 4.2.2, Appendix 1.2 Correction Conformation to the EMC Directive and Low Voltage Instruction, Section 1.2, 1.3, 1.4, Chapter 2, Section 4.2.1, 4.3.1, 5.1, 5.2
Mar., 2006	SH(NA)-080324E-C	Correction Chapter 3, Section 5.1
Sep., 2006	SH(NA)-080324E-D	Addition Section 6.2.2 Correction Section 6.2.1

Japanese Manual Version SH-080323-D

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INTRODUCTION

Thank you for purchasing the MELSEC-A series PLC.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the A-series PLC you have purchased, so as to ensure correct use.
Please forward a copy of this manual to the end user.

CONTENTS

1 OVERVIEW 1- 1 to 1- 5
1.1 Features 1- 1
1.2 Identifying the Compact CC-Link Embedded I/O Adapter Type 1- 2
1.3 Cautionary Notes when Selecting a CC-Link Embedded I/O Adapter 1- 3
1.4 Specification List 1- 4
1.5 About the Generic, Abbreviated and Technical Terms Used in This Manual 1- 4

2 NAMES AND SETTINGS FOR EACH PART 2- 1 to 2- 2

3 SPECIFICATIONS 3- 1 to 3- 2

4 SPECIFICATIONS FOR CC-LINK EMBEDDED I/O ADAPTER 4- 1 to 4- 10
4.1 Specifications for Input Adapters 4- 1
4.1.1 AJ65MBTL1N-16D CC-Link embedded input adapter 4- 1
4.1.2 AJ65MBTL1N-32D CC-Link embedded input adapter 4- 3
4.2 Specifications for Output Adapters 4- 5
4.2.1 AJ65MBTL1N-16T CC-Link embedded output adapter 4- 5
4.2.2 AJ65MBTL1N-32T CC-Link embedded output adapter 4- 7
4.3 Specifications for Combined Adapters 4- 9
4.3.1 AJ65MBTL1N-16DT CC-Link embedded combined adapter 4- 9

5 HANDLING CC-Link EMBEDDED I/O ADAPTER 5- 1 to 5- 7
5.1 Precautionary Notes for Handling and Installation 5- 1
5.2 Cascading Method 5- 5
5.3 Connection Method of CC-Link Dedicated Cable 5- 6

6 TROUBLESHOOTING 6- 1 to 6- 5
6.1 Verifying Errors from LED Status 6- 1
6.2 Examples of Errors for CC-Link Embedded I/O Adapter 6- 3
6.2.1 Errors occurring in the input circuit and corrective actions 6- 3
6.2.2 Errors occurring in the output circuit and corrective actions 6- 5

APPENDIX App- 1 to App- 2
Appendix 1 External Dimensions ..... App- 1
Appendix 1.1 AJ65MBTL1N-16□ ..... App- 1
Appendix 1.2 AJ65MBTL1N-32□ ..... App- 2

About Manuals

The following manuals are also related to this product.

In necessary, order them by quoting the details in the tables below.

Related Manuals

Manual Name	Manual Number (Model Code)
Control Communication Link System Master/Local Module User's Manual This manual describes the system configuration, performance specification, function, handling, wiring and troubleshooting for QJ61BT11 (Sold separately)	SH-080016 (13JL91)
CC-Link System Master (Local Module type AJ61BT11/A1SJ61BT11 User's Manual This manual describes the system configuration, performance specification, function, handling, wiring and troubleshooting for AJ61BT11 and A1SJ61BT11. (Sold separately)	IB-66721 (13J872)
CC-Link System Master (Local Module type AJ61QBT11/A1SJ61QBT11 User's Manual This manual describes the system configuration, performance specification, function, handling, wiring and troubleshooting for AJ61QBT11 and A1SJ61QBT11. (Sold separately)	IB-66722 (13J873)

Conformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please see Chapter 3, "EMC Directive and Low Voltage Instruction" of the PLC CPU User's Manual (Hardware).

The CE logo is printed on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

By making this product conform to the EMC directive and low voltage instruction, it is not necessary to make those steps individually.

1 OVERVIEW

This manual describes the specifications of the CC-Link embedded I/O adapter used as the remote I/O station of a Control & Communication Link (hereafter abbreviated to CC-Link) system.

1.1 Features

The following are the features of the CC-Link embedded I/O adapter.

(1) Device-embedded CC-Link remote I/O

This adapter is a modular remote I/O used as a device-embedded adapter.

(2) Direct installation to user board

Using a pin header as the external interface for adapter power supply, transmission, I/O signals and others, the adapter can be installed directly to a user board.

(3) Flexible noise reduction measures

Depending on external noise environment, the user board can be equipped with a noise filter to enhance noise resistance as necessary.

(4) Insulation method

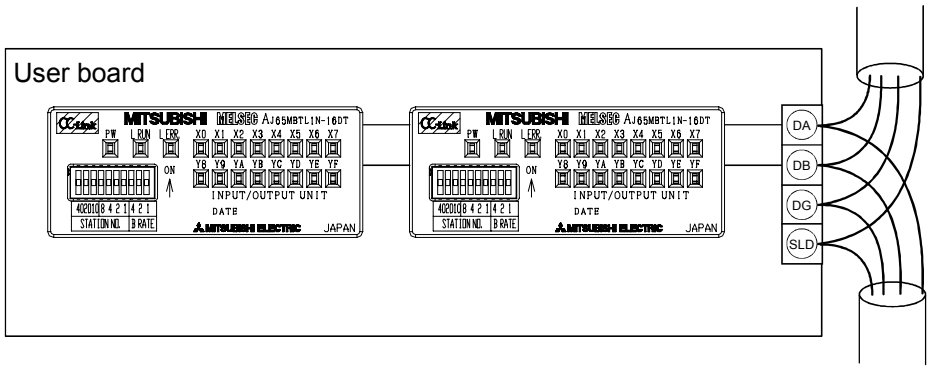
The adapter power supply uses a transformer insulation method and the external I/O uses a photocoupler insulation method.

(5) Overload protection function, overvoltage protection function and overheat protection function

The transistor output section has the overload, overvoltage and overheat protection functions.

(6) Cascade connection

The CC-Link embedded I/O adapters can be cascaded. Two CC-Link embedded I/O adapters can be installed side by side within the same board.



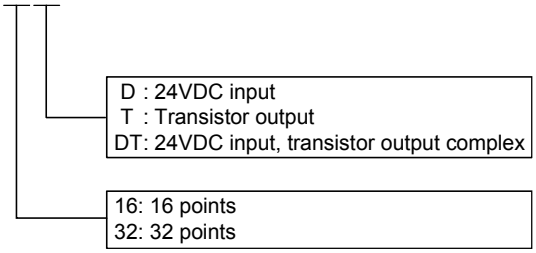
(7) CC-Link Ver. 1.10 compatibility

The CC-Link embedded I/O adapter is compatible with CC-Link Ver. 1.10.

1.2 Identifying the Compact CC-Link Embedded I/O Adapter Type

The following shows how to identify the type of a CC-Link embedded I/O adapter.

AJ65MBTL1N-16DT



1.3 Cautionary Notes when Selecting a CC-Link Embedded I/O Adapter

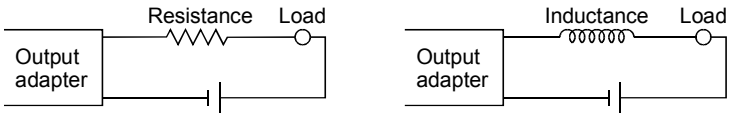
The following explains the cautionary notes and specifications that apply when selecting a CC-Link embedded I/O adapter for use in the CC-Link system:

(1) This is a embedded I/O adapter designed specifically for the CC-Link system. Do not connect the adapter to other data-link systems, such as the MELSECNET/MINI.

(2) 32 points are assigned per station for a CC-Link embedded I/O adapter. The second-half 16 points of a 16-point CC-Link embedded I/O adapter are empty but are not usable.

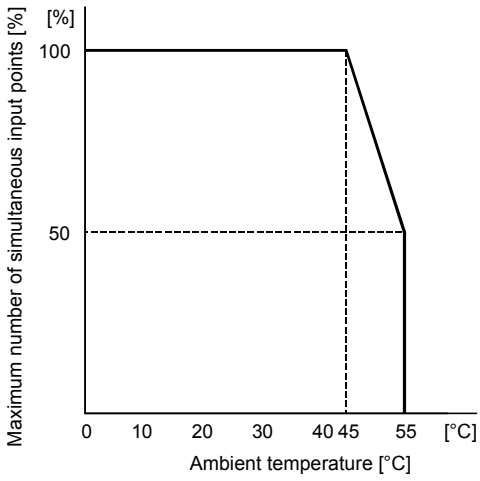
(3) For the maximum switching frequency when driving a load in the CC-Link embedded output adapter, set to one second or more each for ON and OFF.

(4) When using a counter, a timer or the like that uses a DC/DC converter as the load for a CC-Link embedded transistor output adapter having a maximum load current of 0.1A, a rush current flows when the adapter is turned on and at fixed intervals during operation. For this reason, malfunctions may occur if the average current is set. When the above load is used, connect resistance or inductance in parallel to the load, or use an output adapter having a large maximum load current in order to minimize the effects of the rush current.

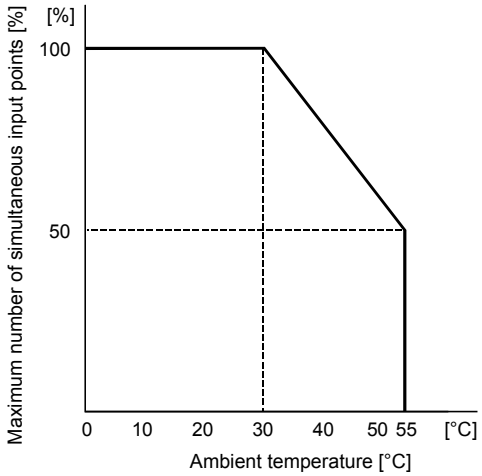


(5) When using the AJ65MBTL1N-16D, AJ65MBTL1N-16DT or AJ65MBTL1N-32D CC-Link embedded I/O adapter, the maximum number of simultaneous input points listed in the specifications will change, depending on the ambient temperature.
The maximum number of simultaneous input points is shown in the diagram below:

(a) Dilating curve for the AJ65MBTL1N-16D or AJ65MBTL1N-16DT



(b) Dilating curve for the AJ65MBTL1N-32D



1.4 Specification List

Specification list for each compact remote I/O adapter is shown below.

Model	Specification	Reference
AJ65MBTL1N-16D	16 points 24VDC positive common (sink) input	Section 4.1.1
AJ65MBTL1N-32D	32 points 24VDC positive common (sink) input	Section 4.1.2
AJ65MBTL1N-16T	16 points transistor output 0.1A sink output	Section 4.2.1
AJ65MBTL1N-32T	32 points transistor output 0.1A sink output	Section 4.2.2
AJ65MBTL1N-16DT	8 points 24VDC positive common (sink) input, 8 points transistor output 0.1A sink output.	Section 4.3.1

1.5 About the Generic, Abbreviated and Technical Terms Used in This Manual

The abbreviated and technical terms used in this manual are listed below:

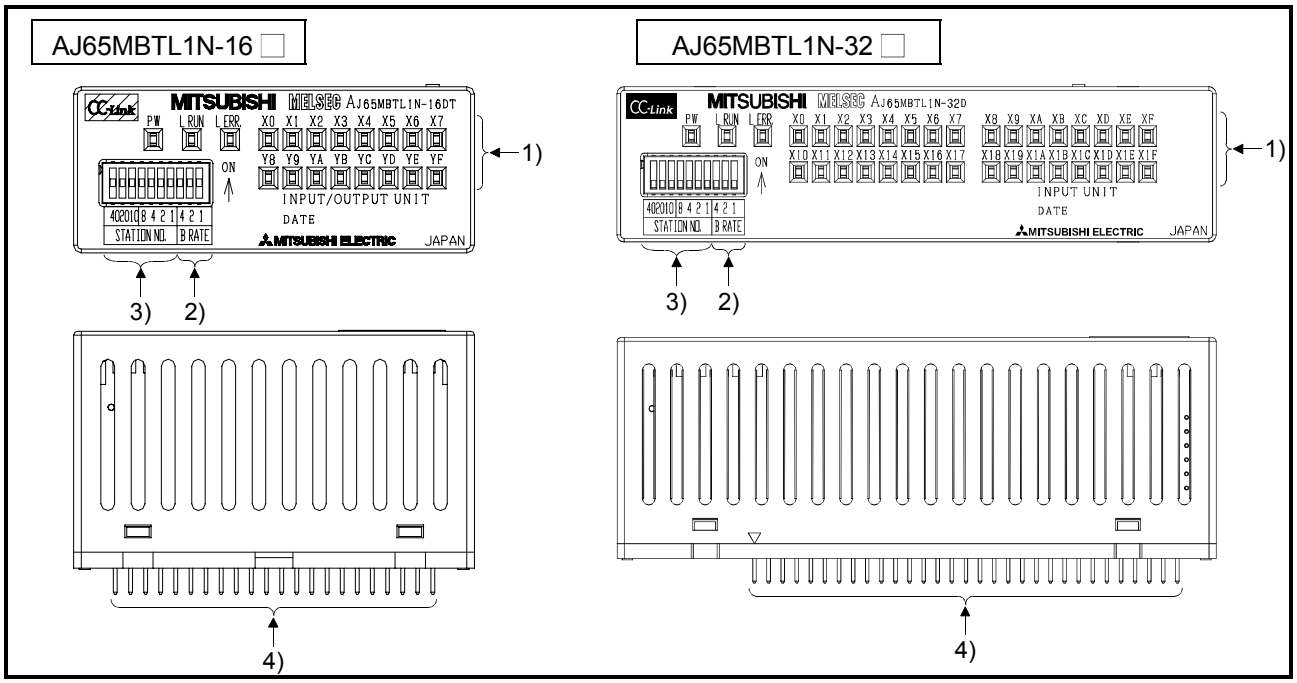
Generic/abbreviated/ technical term	Description
CC-Link	Abbreviation of Control & Communications Link
Master/local module	Generic term for the QJ61BT11, AJ61BT11, A1SJ61BT11, AJ61QBT11 and A1SJ61QBT11 CC-Link system master/local module
CC-Link embedded I/O adapter	Generic term for the AJ65MBTL1N-☐☐ CC-Link embedded I/O adapter
CC-Link embedded input adapter	Generic term for the AJ65MBTL1N-☐D CC-Link embedded input adapter
CC-Link embedded output adapter	Generic term for the AJ65MBTL1N-☐T CC-Link embedded output adapter
CC-Link embedded combined adapter	Generic term for the AJ65MBTL1N-☐DT CC-Link embedded combined adapter

MEMO

1 - 5

2 NAMES AND SETTINGS FOR EACH PART

The names and settings for the component of the CC-Link embedded I/O adapter are shown below.



No.	Item	Description	
1)	Operating status indicator LEDs	LED name	Confirmation details
		PW	Turns on when power supply of CC-Link embedded I/O adapter is turned on.
		L RUN	Checks if the input adapter is communicating with the master station of CC-Link embedded I/O adapter normally. Turns on when normal data is received from master station, and turns off when time has expired.
		L ERR	On: Communication data error. Flicker at regular intervals: Indicates that the station number setting or transmission speed setting switch position was changed while power is on. Flicker at irregular intervals: Indicates that the terminal resistor is left unconnected or that the CC-Link embedded I/O adapter or CC-Link dedicated cable is affected by noise. Off: Normal communication.
		X0 to XF/X0 to X1F Y0 to YF/Y0 to Y1F	Shows on/off status of I/O. Lit when on, unlit when off.

2 - 1

<table>
<tr><th>No.</th><th>Item</th><th>Description</th></tr>
<tr><td>2)</td><td>Transmission speed setting</td><td>
<table>
<tr><th rowspan="2">Setting value</th><th colspan="3">Setting switch status</th><th rowspan="2">Transmission speed</th></tr>
<tr><th>4</th><th>2</th><th>1</th></tr>
<tr><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td><td>156 kbps</td></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>ON</td><td>625 kbps</td></tr>
<tr><td>2</td><td>OFF</td><td>ON</td><td>OFF</td><td>2.5 Mbps</td></tr>
<tr><td>3</td><td>OFF</td><td>ON</td><td>ON</td><td>5.0 Mbps</td></tr>
<tr><td>4</td><td>ON</td><td>OFF</td><td>OFF</td><td>10 Mbps</td></tr>
</table>
Be sure to set the transmission speed within the above range.
</td></tr>
<tr><td>3)</td><td>Station number setting switches</td><td>
Select "10," "20" or "40" to set the ten's place of the station number.
Select "1," "2," "4" or "8" to set the one's place of the station number.
Always set the station number within the range of 1 to 64.
∗1 Duplicate station number cannot be set.
<table>
<tr><th rowspan="2">Station number</th><th colspan="3">Ten's place</th><th colspan="4">One's place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>2</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>3</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td></td></tr>
<tr><td>4</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>10</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>11</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>64</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
</table>
(Example) Set the switches as below when setting the station number to 32:
<table>
<tr><th rowspan="2">Station number</th><th colspan="3">Ten's place</th><th colspan="4">One's place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>32</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>4)</td><td>External I/F pin header</td><td>Pin header for connection of the adapter power supply, communication line, I/O power supply, external supply power, and input/output signals (refer to Chapter 4 for the pin numbers.)</td></tr>
</table>

2 - 2

3 SPECIFICATIONS

This section explains the CC-Link embedded I/O adapter general specifications.

Table 3.1 General specifications

Item	Specifications					
Operating ambient temperature	0 to 55 °C					
Storage ambient temperature	-20 to 75 °C					
Operating ambient humidity	10 to 90 % RH, No condensation					
Storage ambient humidity	10 to 90 % RH, No condensation					
Vibration resistance	Conforming to JIS B 3502, IEC 61132-2		Frequency	Acceleration	Amplitude	Sweep Count
		When there is intermittent vibration	10 to 57 Hz	—	0.075 mm	10 times each in X, Y and Z axis (80 minutes)
			57 to 150 Hz	9.8 m/s^2	—	
		When there is continuous vibration	10 to 57 Hz	—	0.035 mm	
			57 to 150 Hz	4.9 m/s^2	—	
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, 3 times each in 3 directions)					
Operating environment	No corrosive gas present					
Operating height	2000 m(6562 ft) or less ∗3					
Installation area	On the control board					
Over-voltage category ∗1	II or less					
Pollution rate ∗2	2 or less					

∗1 Indicates the location where the device is connected from the public cable network to the device structure wiring area.
Category II applies to the devices to which the power is supplied from a fixed equipment. Surge withstand voltage for devices with up to 300 V of rated voltage is 2500 V.

∗2 This is an index which indicates the degree of conductive object generation in the environment Pollution level 2 is when only non-conductive pollution occurs.
A temporary conductivity caused by condensation must be expected occasionally.

∗3 Do not use or store the PLC in the environment where the pressure is higher than the atmospheric pressure at sea level. Otherwise, malfunction may result. To use the PLC in high-pressure environment, contact your nearest Mitsubishi representative.

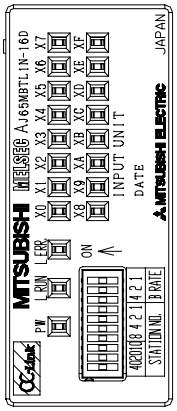
MEMO

3 - 2

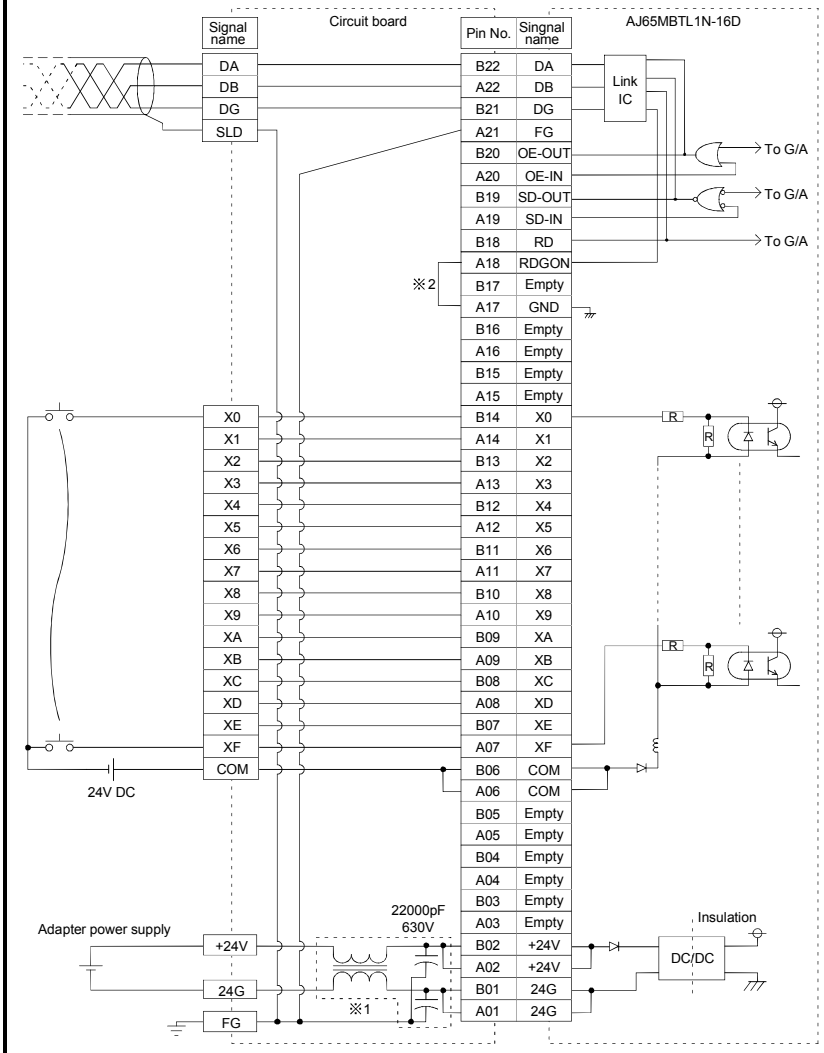
4 SPECIFICATIONS FOR CC-LINK EMBEDDED I/O ADAPTER

4.1 Specifications for Input Adapters

4.1.1 AJ65MBTL1N-16D CC-Link embedded input adapter

Specification \ Form		DC input adapter	
		AJ65MBTL1N-16D	Surface shape
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24V DC	
Rated input current		Approx. 4mA	
Operating voltage range		19.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneous ON input points		50% (See section 1.3)	
ON voltage/ON current		18V or higher/3.5mA or higher	
OFF voltage/OFF current		6V or lower/1.7mA or lower	
Input resistance		Approx. 5.1kΩ	
Response time	OFF→ON	1.5ms or lower (at 24V DC)	
	ON→OFF	1.5ms or lower (at 24V DC)	
Input type		Positive common (sink)	
Wiring method for common		16 points/1 common	
CC-Link station type		Remote I/O station	
Number of occupied stations		1 station 32 points assignment (use 16 points)	
I/O adapter power supply	Voltage	20.4 to 26.4V DC (ripple rate: within 5%)	
	Current	35mA or lower (at 24V DC)	
Noise durability		DC type noise voltage 500Vp-p, noise width 1μs, noise carrier frequency 25 to 60Hz (noise simulator condition)	
Dielectric withstand voltage		500V AC for 1 minute between all DC external terminals and ground	
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester	
Weight		0.03kg	
External wiring system		44-pin, 2-row, 2mm-pitch pin header	

External connection

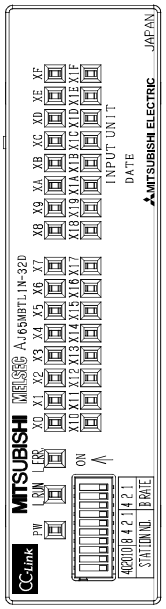


Pin No.	Signal name	Pin No.	Signal name
B22	DA	A22	DB
B21	DG	A21	FG
B20	OE-OUT	A20	OE-IN
B19	SD-OUT	A19	SD-IN
B18	RD	A18	RDGON
B17	Empty	A17	GND
B16	Empty	A16	Empty
B15	Empty	A15	Empty
B14	X0	A14	X1
B13	X2	A13	X3
B12	X4	A12	X5
B11	X6	A11	X7
B10	X8	A10	X9
B09	XA	A09	XB
B08	XC	A08	XD
B07	XE	A07	XF
B06	COM	A06	COM
B05	Empty	A05	Empty
B04	Empty	A04	Empty
B03	Empty	A03	Empty
B02	+ 24V	A02	+ 24V
B01	24G	A01	24G

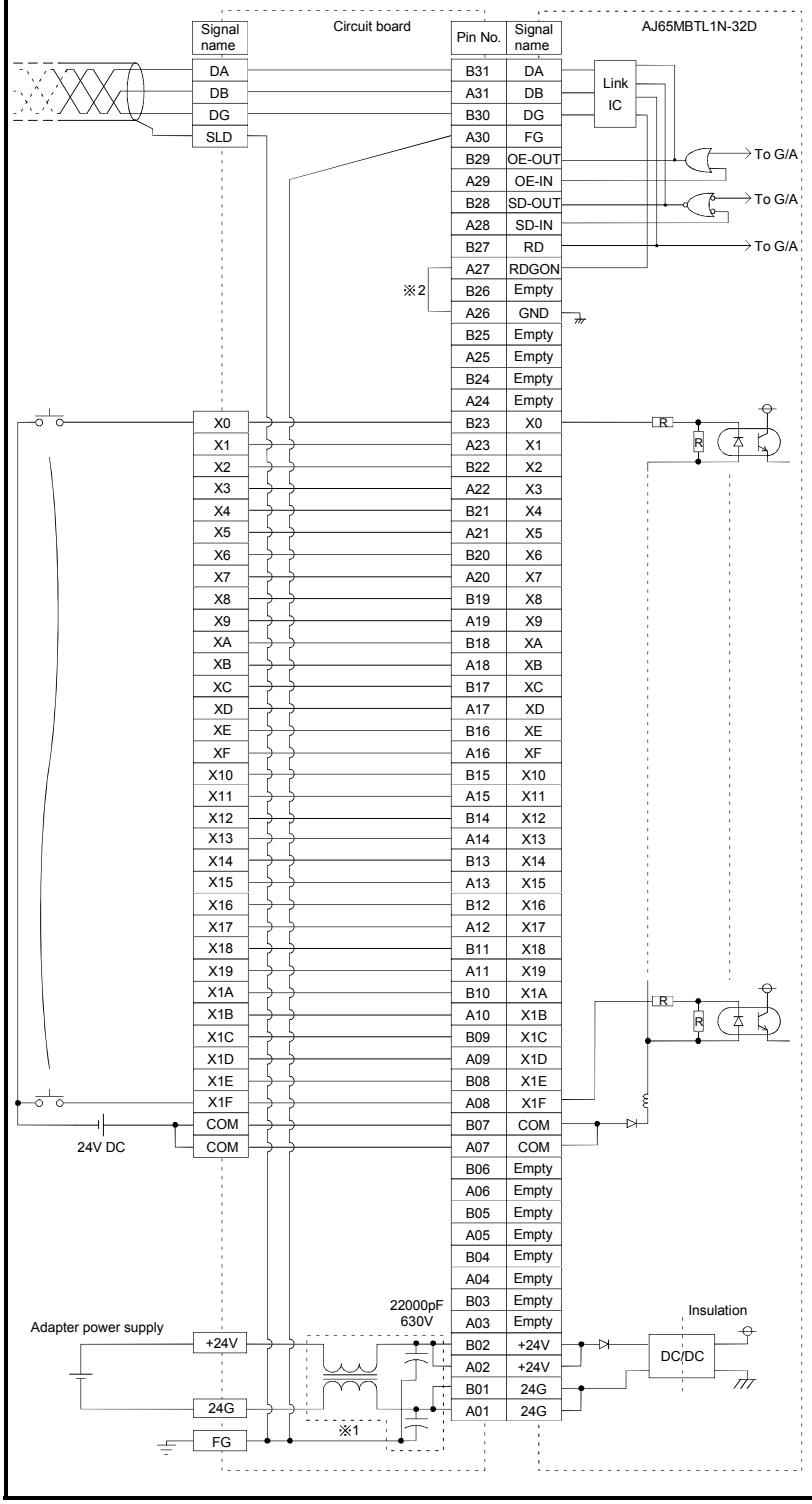
※1: Add circuit for noise reduction capability.
(Refer to Section 5.1 for details.)
※2: Connect A17 and A18 when the adapters are not cascaded.

4 - 2

4.1.2 AJ65MBTL1N-32D CC-Link embedded input adapter

Specification \ Form		DC input adapter	
		AJ65MBTL1N-32D	Surface shape
Number of input points		32 points	
Isolation method		Photocoupler	
Rated input voltage		24V DC	
Rated input current		Approx. 4mA	
Operating voltage range		19.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneous ON input points		50% (See section 1.3)	
ON voltage/ON current		18V or higher/3.5mA or higher	
OFF voltage/OFF current		6V or lower/1.7mA or lower	
Input resistance		Approx. 5.1kΩ	
Response time	OFF→ON	1.5ms or lower (at 24V DC)	
	ON→OFF	1.5ms or lower (at 24V DC)	
Input type		Positive common (sink)	
Wiring method for common		32 points/1 common	
CC-Link station type		Remote I/O station	
Number of occupied stations		1 station 32 points assignment (use 32 points)	
I/O adapter power supply	Voltage	20.4 to 26.4V DC (ripple rate: within 5%)	
	Current	45mA or lower (at 24V DC)	
Noise durability		DC type noise voltage 500Vp-p, noise width 1μs, noise carrier frequency 25 to 60Hz (noise simulator condition)	
Dielectric withstand voltage		500V AC for 1 minute between all DC external terminals and ground	
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester	
Weight		0.04kg	
External wiring system		62-pin, 2-row, 2mm-pitch pin header	

External connection



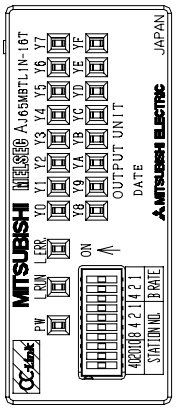
Pin No.	Signal name	Pin No.	Signal name
B31	DA	A31	DB
B30	DG	A30	FG
B29	OE-OUT	A29	OE-IN
B28	SD-OUT	A28	SD-IN
B27	RD	A27	RDGON
B26	Empty	A26	GND
B25	Empty	A25	Empty
B24	Empty	A24	Empty
B23	X0	A23	X1
B22	X2	A22	X3
B21	X4	A21	X5
B20	X6	A20	X7
B19	X8	A19	X9
B18	XA	A18	XB
B17	XC	A17	XD
B16	XE	A16	XF
B15	X10	A15	X11
B14	X12	A14	X13
B13	X14	A13	X15
B12	X16	A12	X17
B11	X18	A11	X19
B10	X1A	A10	X1B
B09	X1C	A09	X1D
B08	X1E	A08	X1F
B07	COM	A07	COM
B06	Empty	A06	Empty
B05	Empty	A05	Empty
B04	Empty	A04	Empty
B03	Empty	A03	Empty
B02	+24V	A02	+24V
B01	24G	A01	24G

※1: Add circuit for noise reduction capability.
(Refer to secton 5.1 for details.)
※2: Connect A26 and A27 when the adapters are not cascaded.

4 - 4

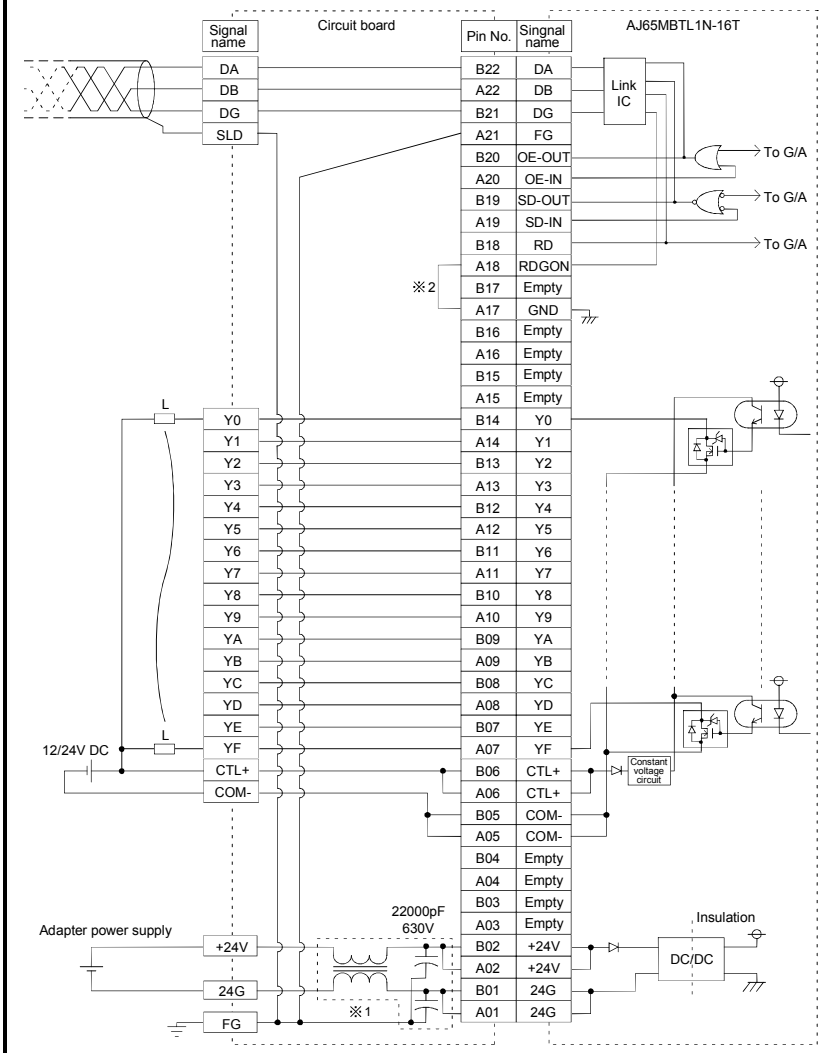
4.2 Specifications for Output Adapters

4.2.1 AJ65MBTL1N-16T CC-Link embedded output adapter

Specification \ Form		Transistor output adapter	
		AJ65MBTL1N-16T	Surface shape
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. load current		0.1A/point, 1.6A/1 common	
Max. inrush current		0.7A 10ms or lower	
Leakage current at OFF		0.1mA or lower	
Max. voltage drop at ON		0.1V or lower (TYP) 0.1A 0.2V or lower (MAX) 0.1A	
Output method		Sink type	
Protection functions		Overload, over-voltage and overheat protection	
Response time	OFF→ON	1ms or lower	
	ON→OFF	1ms or lower (rated load, resistive load)	
External Power supply for output	Voltage	10.2 to 26.4V DC (ripple ratio: within 5%)	
	Current	10mA or lower (When all points are ON at 24V DC) Not including external load current	
Surge suppression		Zener diode	
Wiring method for common		16 points/1 common	
CC-Link station type		Remote I/O station	
Number of occupied stations		1 station 32 points assignment (use 16 points)	
I/O adapter power supply	Voltage	20.4 to 26.4V DC (ripple ratio: within 5%)	
	Current	50mA or lower (When all points are ON at 24V DC)	
Noise durability		DC type noise voltage 500Vp-p, noise width 1μs, noise carrier frequency 25 to 60Hz (noise simulator condition)	
Dielectric withstand voltage		500V AC for 1 minute between all DC external terminals and ground	
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester	
Weight		0.03kg	
External wiring system		44-pin, 2-row, 2mm-pitch pin header	

4 - 5

External connection

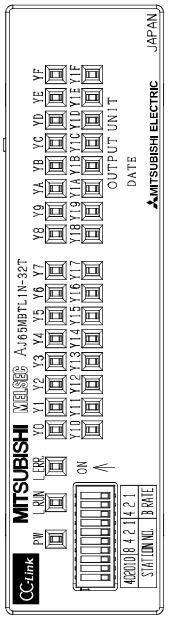


Pin No.	Signal name	Pin No.	Signal name
B22	DA	A22	DB
B21	DG	A21	FG
B20	OE-OUT	A20	OE-IN
B19	SD-OUT	A19	SD-IN
B18	RD	A18	RDGON
B17	Empty	A17	GND
B16	Empty	A16	Empty
B15	Empty	A15	Empty
B14	Y0	A14	Y1
B13	Y2	A13	Y3
B12	Y4	A12	Y5
B11	Y6	A11	Y7
B10	Y8	A10	Y9
B09	YA	A09	YB
B08	YC	A08	YD
B07	YE	A07	YF
B06	CTL+	A06	CTL+
B05	COM-	A05	COM-
B04	Empty	A04	Empty
B03	Empty	A03	Empty
B02	+ 24V	A02	+ 24V
B01	24G	A01	24G

※1: Add circuit for noise reduction capability. (Refer to Section 5.1 for details.)
※2: Connect A17 and A18 when the adapters are not cascaded.

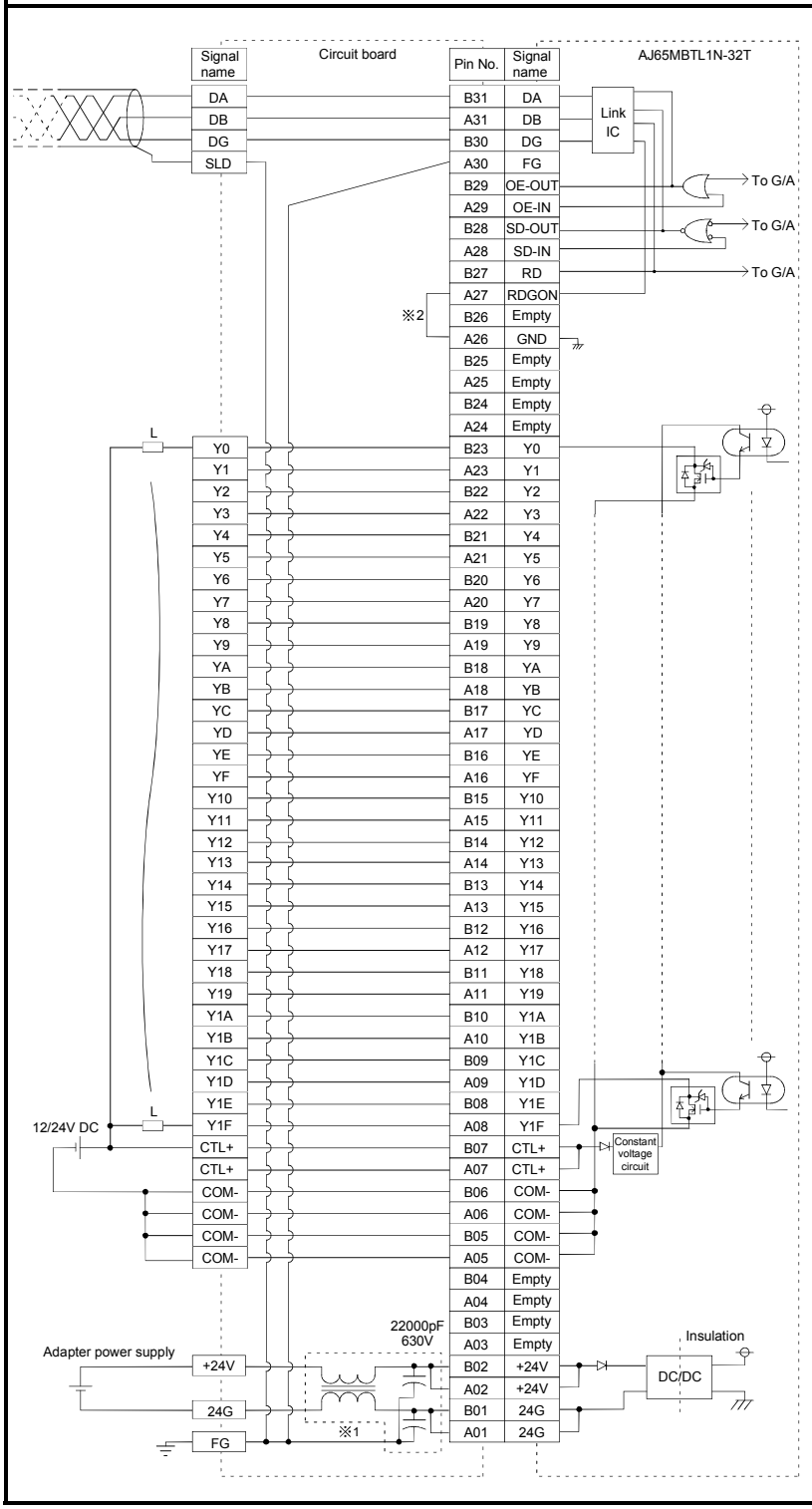
4 - 6

4.2.2 AJ65MBTL1N-32T CC-Link embedded output adapter

Specification \ Form		Transistor output adapter	
		AJ65MBTL1N-32T	Surface shape
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. load current		0.1A/point, 3.2A/1 common	
Max. inrush current		0.7A 10ms or lower	
Leakage current at OFF		0.1mA or lower	
Max. voltage drop at ON		0.1V or lower (TYP) 0.1A 0.2V or lower (MAX) 0.1A	
Output method		Sink type	
Protection functions		Overload, over-voltage and overheat protection	
Response time	OFF→ON	1ms or lower	
	ON→OFF	1ms or lower (rated load, resistive load)	
External Power supply for output	Voltage	10.2 to 26.4V DC (ripple ratio: within 5%)	
	Current	15mA or lower (When all points are ON at 24V DC) Not including external load current	
Surge suppression		Zener diode	
Wiring method for common		32 points/1 common	
CC-Link station type		Remote I/O station	
Number of occupied stations		1 station 32 points assignment (use 32 points)	
I/O adapter power supply	Voltage	20.4 to 26.4V DC (ripple ratio: within 5%)	
	Current	60mA or lower (When all points are ON at 24V DC)	
Noise durability		DC type noise voltage 500Vp-p, noise width 1μs, noise carrier frequency 25 to 60Hz (noise simulator condition)	
Dielectric withstand voltage		500V AC for 1 minute between all DC external terminals and ground	
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester	
Weight		0.04kg	
External wiring system		62-pin, 2-row, 2mm-pitch pin header	

4 - 7

External connection



Pin No.	Signal name	Pin No.	Signal name
B31	DA	A31	DB
B30	DG	A30	FG
B29	OE-OUT	A29	OE-IN
B28	SD-OUT	A28	SD-IN
B27	RD	A27	RDGON
B26	Empty	A26	GND
B25	Empty	A25	Empty
B24	Empty	A24	Empty
B23	Y0	A23	Y1
B22	Y2	A22	Y3
B21	Y4	A21	Y5
B20	Y6	A20	Y7
B19	Y8	A19	Y9
B18	YA	A18	YB
B17	YC	A17	YD
B16	YE	A16	YF
B15	Y10	A15	Y11
B14	Y12	A14	Y13
B13	Y14	A13	Y15
B12	Y16	A12	Y17
B11	Y18	A11	Y19
B10	Y1A	A10	Y1B
B09	Y1C	A09	Y1D
B08	Y1E	A08	Y1F
B07	CTL+	A07	CTL+
B06	COM-	A06	COM-
B05	COM-	A05	COM-
B04	Empty	A04	Empty
B03	Empty	A03	Empty
B02	+24V	A02	+24V
B01	24G	A01	24G

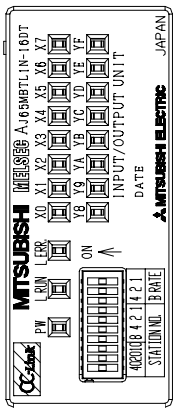
※1: Add circuit for noise reduction capability. (Refer to Section 5.1 for details.)

※2: Connect A26 and A27 when the adapters are not cascaded.

4 - 8

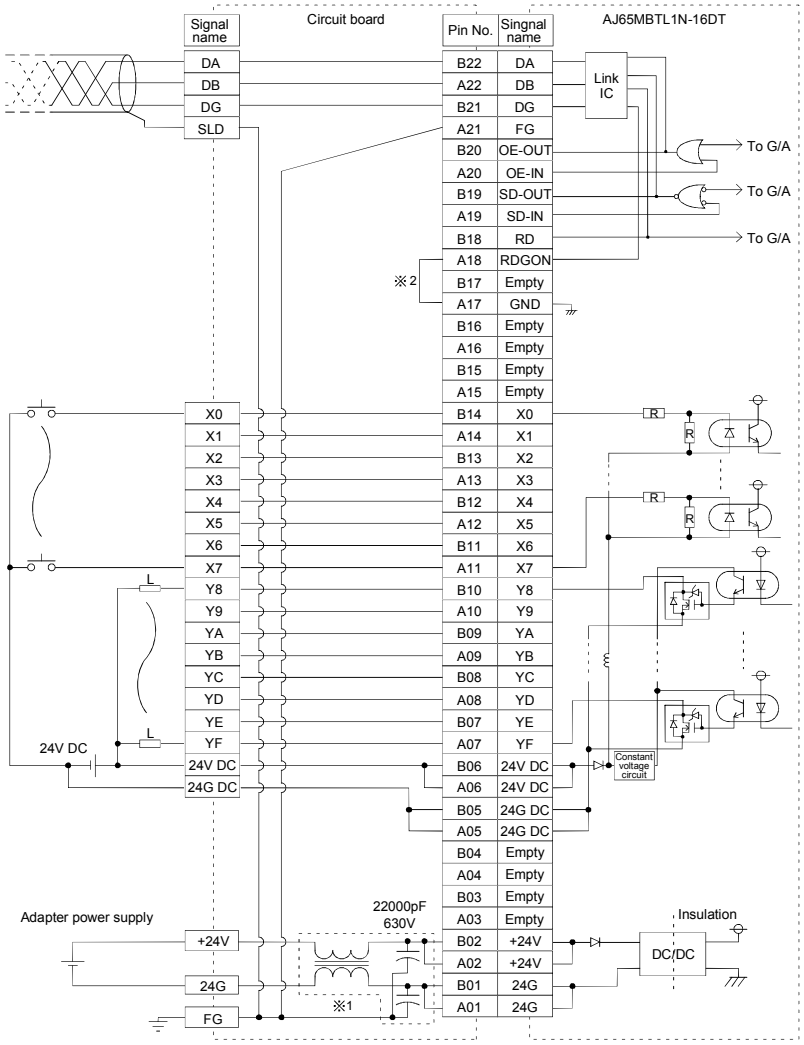
4.3 Specifications for Combined Adapters

4.3.1 AJ65MBTL1N-16DT CC-Link embedded combined adapter

Specification \ Form		DC input transistor output combined adapter			
		AJ65MBTL1N-16DT			Surface shape
Input specification			Output specification		
Number of input points		8 points	Number of output points		8 points
Isolation method		Photocoupler	Isolation method		Photocoupler
Rated input voltage		24V DC	Rated load voltage		24V DC
Rated input current		Approx. 7mA	Operating load voltage range		19.2 to 26.4V DC(ripple ratio: within 5%)
Operating voltage range		19.2 to 26.4V DC (ripple ratio: within 5%)	Max. load current		0.1A/point 0.8A/common
Max. simultaneous input points		50% (See section 1.3)	Max. inrush current		0.7A 10ms or lower
ON voltage/ON current		14V or higher/3.5mA or higher	Leakage current at OFF		0.1mA or lower
OFF voltage/OFF current		6V or lower/1.7mA or lower	Max. voltage drop at ON		0.1V or lower (TYP)0.1A 0.2V or lower (MAX)0.1A
Input resistance		A pprox. 3.3k Ω	Output type		Sink type
			Protection functions		Overload, over-voltage and overheat protection
Response time	OFF →ON	1.5ms or lower (at 24V DC)	Response time	OFF →ON	1ms or lower
	ON →OFF	1.5ms or lower (at 24V DC)		ON →OFF	1ms or lower (rated load, resistive load)
			External Power supply for output	Voltage	19.2 to 26.4V DC (ripple ratio: within 5%)
				Current	5mA or lower (When all points are ON at 24V DC) Not including external load current
Input type		Positive common (Sink type)	Surge suppression		Zener diode
Wiring method for common		16 points/1 common			
CC-Link station type		Remote I/O station			
Number of occupied stations		1 station 32 points assignment (use 16 points)			
I/O adapter power supply	Voltage	20.4 to 26.4V DC(ripple ratio: within 5%)			
	Current	50mA or lower (when all points are ON at 24V DC) Not including external load current			
Noise durability		DC type noise voltage 500Vp-p, noise width 1μs, noise carrier frequency 25 to 60Hz(noise simulator condition)			
Dielectric withstand voltage		500V AC for 1 minute between all DC external terminals and ground			
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester between all DC external terminals and ground			
Weight		0.03kg			
External wiring system		44-pin, 2-row, 2mm-pitch pin header			

4 - 9

External connection



Pin No.	Signal name	Pin No.	Signal name
B22	DA	A22	DB
B21	DG	A21	FG
B20	OE-OUT	A20	OE-IN
B19	SD-OUT	A19	SD-IN
B18	RD	A18	RDGON
B17	Empty	A17	GND
B16	Empty	A16	Empty
B15	Empty	A15	Empty
B14	X0	A14	X1
B13	X2	A13	X3
B12	X4	A12	X5
B11	X6	A11	X7
B10	Y8	A10	Y9
B09	YA	A09	YB
B08	YC	A08	YD
B07	YE	A07	YF
B06	24V DC	A06	24V DC
B05	24G DC	A05	24G DC
B04	Empty	A04	Empty
B03	Empty	A03	Empty
B02	+ 24V	A02	+ 24V
B01	24G	A01	24G

※1: Add circuit for noise reduction capability. (Refer to Section 5.1 for details.)

※2: Connect A17 and A18 when the adapters are not cascaded.

4 - 10

5 HANDLING CC-Link EMBEDDED I/O ADAPTER

5.1 Precautionary Notes for Handling and Installation

The precautionary notes when handling and installing the CC-Link embedded I/O adapter for the CC-Link system are described below.

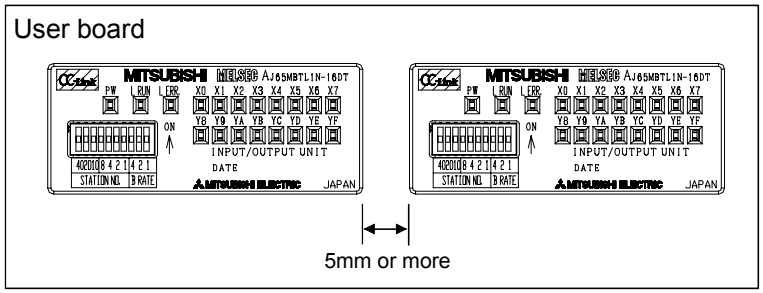
⚠DANGER	• Do not touch the terminals or connector while the power is on. Doing so may cause electric shock or malfunction.

⚠CAUTION	• Make sure that there are no foreign substances such as sawdust or wiring debris inside the CC-Link embedded I/O adapter. Such debris could cause fire, failure or malfunction. • Do not disassemble or modify the CC-Link embedded I/O adapter. Doing so could cause failure, malfunction, injury or fire. • Do not directly touch the CC-Link embedded I/O adapter's conductive parts. Doing so could cause malfunction or failure in the CC-Link embedded I/O adapter. • Because the case of the CC-Link embedded I/O adapter is made of resin, be careful not to drop it or expose it to strong impact. It may damage the CC-link embedded I/O adapter. • When disposing of this product, treat it as industrial waste. • Use the CC-Link embedded I/O adapter in an environment that meets the general specifications contained in this manual. Using this adapter in an environment outside the range of the general specifications could result in electric shock, fire, malfunction, and damage to or deterioration of the product. • Before mounting or dismounting the user board loaded with the CC-Link embedded I/O adapter to or from an enclosure, always switch power off externally in all phases. Failure to do so may damage the CC-Link embedded I/O adapter or cause malfunction.

(1) Restrictions on close installation

Because of heat generation, do not install the CC-Link embedded I/O adapters closely to each other.

Install the CC-Link embedded I/O adapters at least 5mm away from each other.

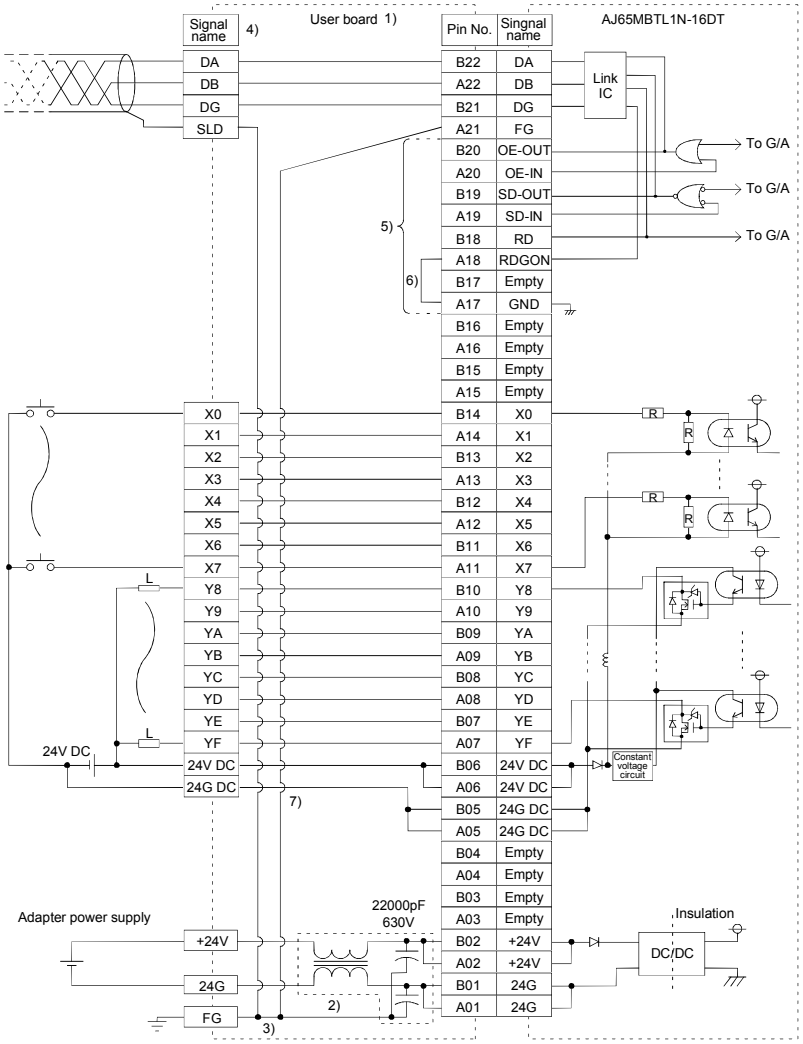


(2) Precautions for external wiring

Note the following when designing the user board side circuit and board patterns.

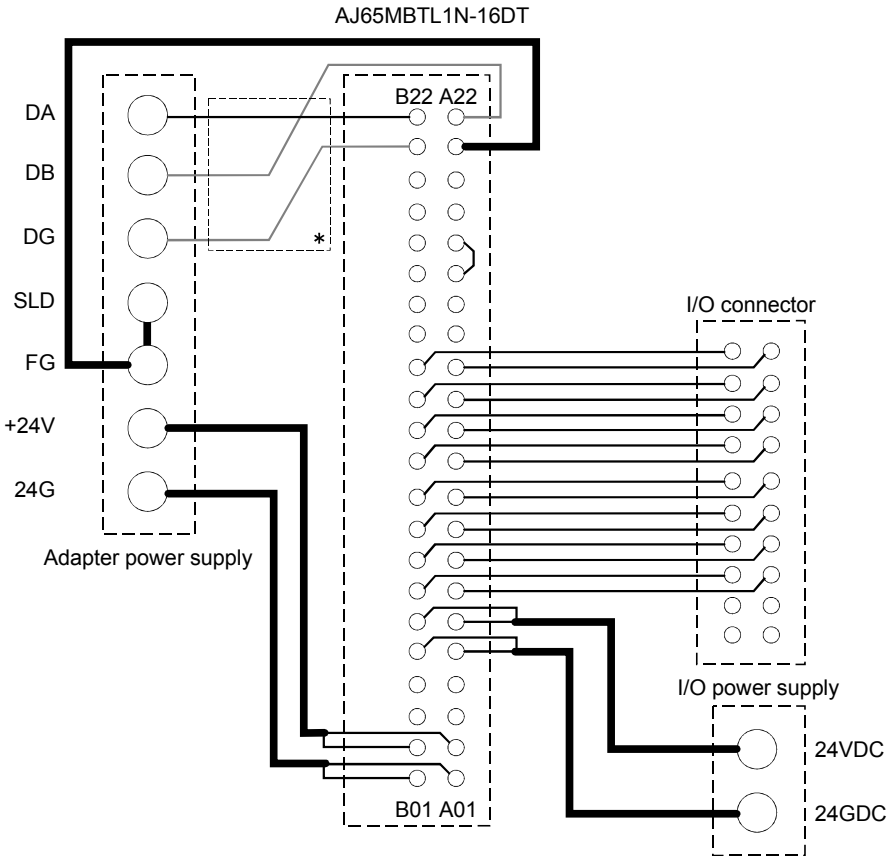
1) Use a user board of 1.6mm thickness.
2) When the noise immunity must be increased, insert a noise filter (FDK make: NFR5UI203MB or equivalent) and Y capacitor (22000pF 630V) in the adapter power supply line.
3) Connect the transmission SLD and FG within the board.
   As a pattern, connect SLD and FG as near as possible to the external I/O terminals.
4) Make the transmission patterns (DA, DB) as short as possible.
   Design the patterns so that the capacitance is 20pF or less with the CC-Link embedded I/O adapter mounted on the board. (Guidelines: Pattern length 5cm or less, pattern width 0.18mm or less)
5) Since the cascade communication signal pins (16-point adapter: A17 to A20 pins and B17 to B20 pins, 32-point adapter: A26 to A29 pins and B26 to B29 pins) are susceptible to noise, keep them as far away as possible from the other patterns (power supply, I/O signal) that include noise.
6) When the adapters are not cascaded, always connect GND and RDGON (16-point adapter: A17 pin and A18 pin, 32-point adapter: A26 pin and A27 pin) on the board side.
7) Wire the FG pattern so that it does not cross the I/O patterns on the front and back sides of the board.
   Doing so makes the adapter sensitive to noise.

(Example: AJ65MBTL1N-16DT)



[Board pattern example]

(top view)



*: When using a multi-layer board, eliminate the inner layers to prevent the capacitance between DA and DB from increasing.

(3) Precautions for soldering

Note the following when soldering the CC-Link embedded I/O adapter to the user board.

(a) Before soldering, do not store the CC-Link embedded I/O adapter in dusty, gas-corrosive or similar environment that may deteriorate the solderability of the adapter pins.

(b) Do not touch the pins of the CC-Link embedded I/O adapter directly. Doing so can cause the deterioration of solderability.

(c) Do not bend or cut the pins of the CC-Link embedded I/O adapter. In addition, do not use the CC-Link embedded I/O adapter that has been dropped, impacted and/or stressed. Doing so can cause a malfunction or like.

(d) Do not clean the adapter before and after soldering work.

(e) Do not use corrosive flux, e.g. acid or alkali.

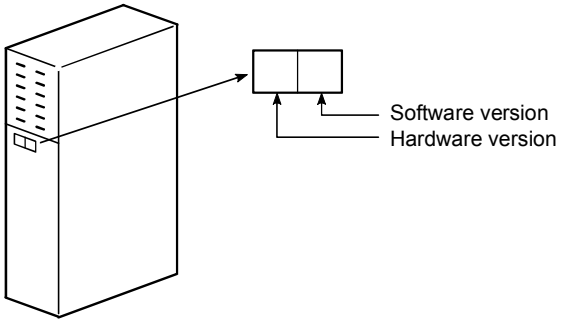
(f) Carry out hand soldering or post soldering. Do not perform flow soldering.

(4) Precautions for T-branch system configuration

When configuring a T-branch system, use any of the following CC-Link master modules.

Module type	Hardware version
QJ61BT11	All versions usable
AJ61BT11	D or later
AJ61QBT11	D or later
A1SJ61BT11	E or later
A1SJ61QBT11	E or later

Confirm the module version as shown below.



(5) The overload protection function, overvoltage protection function and overheat protection function are described below.

- CC-Link embedded I/O adapters with overload protection function, overvoltage protection function and overheat protection function

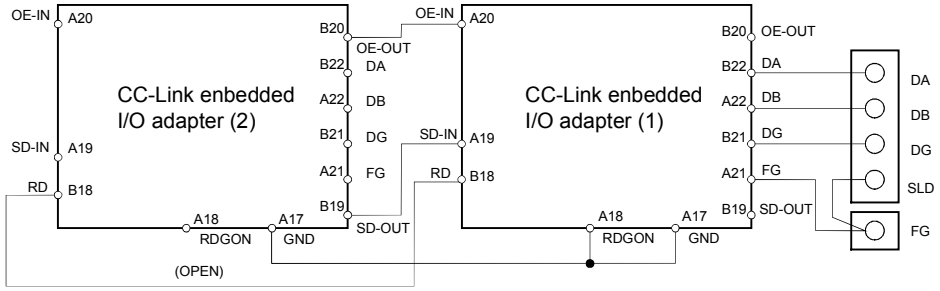
CC-Link embedded output adapter	AJ65MBTL1N-16T, AJ65MBTL1N-32T
CC-Link embedded combined adapter	AJ65MBTL1N-16DT

Function	Description
Common to overload protection function, overvoltage protection function and overheat protection function	1. When overcurrent due to an overload continues to exist, this generates heat and the overheat protection function is activated. 2. These functions are for protecting the adapters' internal elements but not for external devices.
Overload protection function	1. The overload protection function is activated in a load condition of 1 A to 3 A per point. 2. The overload protection function automatically returns to normal operation when the load drops to the rated value.
Overvoltage protection function	1. This function protects elements from an abrupt surge caused when a coil load is used.
Overheat protection function	1. The overheat protection function works in two-point units. (The points are paired as Y0/Y1, Y2/Y3, etc., and the overheat protector is activated for two points in a pair simultaneously. If the overheat condition is prolonged, the heat spreads and other overheat protectors may also be activated.) 2. The actual output voltage oscillates in the range of 0 V to the load voltage only if the output is ON when the overheat protection function was activated. In this case, the average voltage during oscillation with the load voltage of 24 V is approximately 7 V. (No oscillation occurs when the output is OFF.) To ensure that output turns OFF when the overheat protection function is activated, use an external load that turns OFF at 7 V or more. 3. The overheat protection function automatically returns to normal operation when the heat drops.

5.2 Cascading Method

The CC-Link embedded I/O adapters can be cascaded. Up to two adapters can be installed side by side in the same board.

Cascade the adapters as shown below.
The following diagram gives an example of 16-point CC-Link embedded I/O adapters. Review the pin numbers when 32-point CC-Link embedded I/O adapters are used.



POINT

Since the cascade communication pattern is easily affected by noise, it must be separated as far away as possible from the other noise-laden patterns (power supply, I/O signals).

5.3 Connection Method of CC-Link Dedicated Cable

The procedure for connecting the master adapter and I/O adapter CC-Link dedicated cable is shown below.

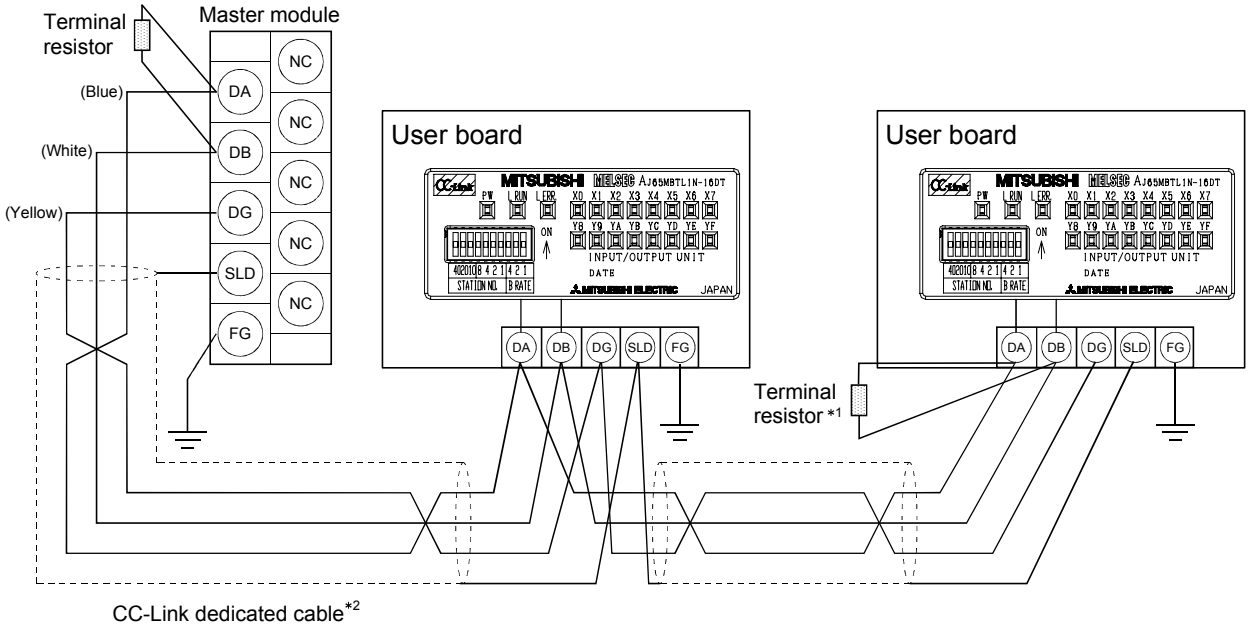
DANGER

- Before beginning any installation or wiring work, make sure all phases of the power supply have been obstructed from the outside.
  Failure to completely shut off the power supply phases may cause electric shock and/or damage to the adapter.
- Make sure to switch all phases of the external power supply off before cleaning or re-tightening the terminal screws.
  Failure to do so may damage the CC-Link embedded I/O adapter or cause malfunction.

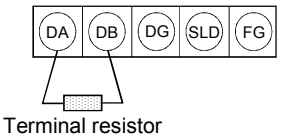
CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm (3.9 in.) or more from each other.
  Not doing so could result in noise that would cause malfunction.
- Always ground the FG terminal to the protective ground conductor.
  Doing so may cause electric shock or malfunction.
- Securely solder the CC-link embedded I/O adapter to install it to a user board.
  Defective contact could cause malfunction.
- Make sure that the communication cable connected to the adapter is kept in the duct or fixed with cramps.
  Failure to do so may cause a damage to the user board or cables due to dangling, shifting or inadvertent handling of cables, or misoperation because of bad cable contacts.
- Do not grab on the cable when removing the communication cable connected to the adapter.
  When removing the cable with a connector, hold the connector on the side that is connected to the adapter.
  When removing the cable without a connector, loose the screws on the side that is connected to the adapter.
  Pulling the cable that is still connected to the adapter may cause a damage to the user board or cable, or malfunction due to bad cable contacts.

(1) The procedure for connecting the master module and I/O adapter is shown below:



∗1 Connect the terminal resistor to the compact remote I/O adapter terminating station in the locations shown below:
(The terminal resistor is provided with the master module.)

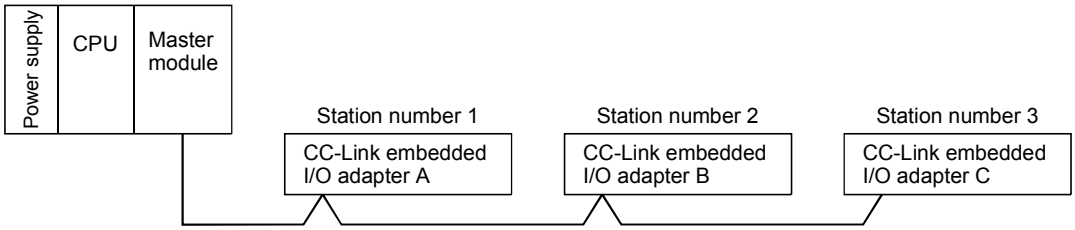


∗2 Use the CC-Link dedicated cables in the CC-Link system.
If the cables other than the CC-Link dedicated cables are used, we cannot guarantee the performance of the CC-Link system.
Refer to the CC-Link Partner Association Home Page: http://www.cc-link.org/ for the specifications and contact information of the CC-Link dedicated cables.

6 TROUBLESHOOTING

6.1 Verifying Errors from LED Status

The following table lists causes and corrective actions for errors indicated by LEDs on the CC-Link embedded I/O adapter when the SW, M/S and PRM LEDs are all off (i.e. the master module is set properly) in the system configuration example shown below.



LED status				Cause	Corrective action
Master module	CC-Link embedded I/O adapter				
	A	B	C		
	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	Normal	—
	PW ○ L RUN ○ L ERR ○	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	Since the LEDs on the CC-Link embedded I/O adapter A are all off, the 24 V power is not supplied or voltage is low.	Check the voltage of the 24 V power supply, and supply the proper power to the CC-Link embedded I/O adapter.
	PW ＊ L RUN ＊ L ERR ＊	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	The CC-Link embedded I/O adapter A is malfunctioning and the LEDs are unstable (all lights are off, in many cases).	Exchange the CC-Link embedded I/O adapter.
TIME ○ LINE ○ or TIME ● LINE ●	PW ● L RUN ● L ERR ○	PW ● L RUN ○ L ERR ○	PW ● L RUN ○ L ERR ○	The L RUN lights on the CC-Link embedded I/O adapter B and beyond are off, indicating the transmission cable between the CC-Link embedded I/O adapter A and B has been disconnected or removed from the terminal block.	Identify the disconnected point by referring to the LED status, and correct it.
	PW ● L RUN ○ L ERR ○	PW ● L RUN ○ L ERR ○	PW ● L RUN ○ L ERR ○	The transmission cable is shorted.	Find the shorted cable among the three transmission cables and repair it.
	PW ● L RUN ○ L ERR ＊	PW ● L RUN ○ L ERR ＊	PW ● L RUN ○ L ERR ＊	The transmission cable is wired incorrectly.	Check the wiring on the terminal block of the user board and correct the incorrect wiring.
				The transmission patterns have been connected incorrectly.	Check the transmission patterns on the user board and correct the incorrectly connected portions.
	PW ● L RUN ○ L ERR ○	PW ● L RUN ● L ERR ○	PW ● L RUN ○ L ERR ○	The L RUN lights on the CC-Link embedded I/O adapters A and C are off, indicating the station numbers for A and C are overlapping.	Restart the power supply after the overlapped station numbers for the CC-Link embedded I/O adapters are corrected.

●: lit, ○: unlit, ◎ : flashing, ＊: lit, flashing or unlit

6 - 1

LED status				Cause	Corrective action
Master module	CC-Link embedded I/O adapter				
	A	B	C		
	PW ● L RUN ● L ERR ○	PW ● L RUN ○ L ERR ○	PW ● L RUN ● L ERR ○	The L RUN light on the CC-Link embedded I/O adapter B is off, indicating the transmission speed setting for CC-Link embedded I/O adapter B is invalid within the setting range (0 to 4).	Restart the power supply after the transmission speed is set correctly.
TIME ○ LINE ○ or TIME ● LINE ○	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ◎	The L ERR of the CC-Link embedded I/O adapter C is flashing at fixed intervals, indicating the setting switch for CC-Link embedded I/O adapter C has been changed during normal operation.	Return the setting switch of the CC-Link embedded I/O adapter to the original position.
	PW ● L RUN ○ L ERR ●	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	The L RUN of the CC-Link embedded I/O adapter A is off and L ERR of the same CC-Link embedded I/O adapter is lit, indicating the setting switch for CC-Link embedded I/O adapter A is set out of range (transmission speed: 5 to 9, station number: 65 or greater).	Correct the setting switch of the CC-Link embedded I/O adapter, and restart the power supply.
	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ●	PW ● L RUN ● L ERR ○	The L ERR of the CC-Link embedded I/O adapter B is lit, indicating that CC-Link embedded I/O adapter B is being affected by noise. (L RUN may be off.)	Correctly perform grounding of the FGs for the master module and all CC-Link embedded I/O adapters.
TIME ● LINE ● or TIME ○ LINE ●	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ●	PW ● L RUN ● L ERR ●	The L ERR lights on the CC-Link embedded I/O adapter B and beyond are lit, indicating the transmission cable is affected by noise in the area between CC-Link embedded I/O adapters A and B. (L RUN may be off.)	Verify the grounding of the SLD of the transmission cable. Separate the wire from the power cable as much as possible (100 mm (3.94 in.)or more).
	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ○	PW ● L RUN ● L ERR ●	A terminal resistor is not attached. (L RUN may be off.)	Check if a terminal resistor is attached.

●: lit, ○: unlit, ◎: flashing, ∗: lit, flashing or unlit

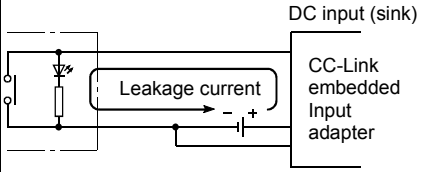
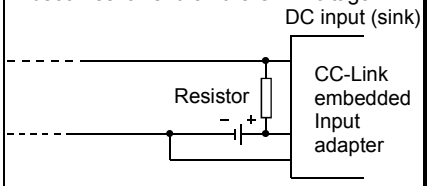
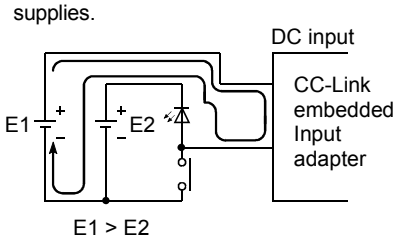
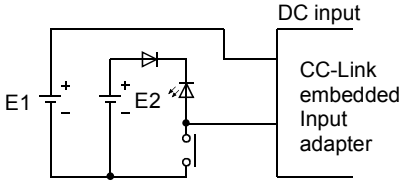
6 - 2

6.2 Examples of Errors for CC-Link Embedded I/O Adapter

This section explains examples of errors that occur in the input circuit, and the appropriate corrective actions.

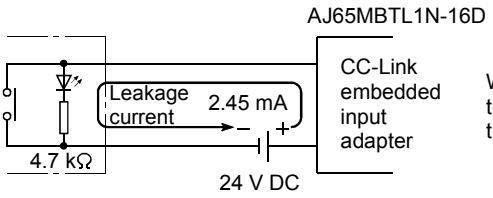
6.2.1 Errors occurring in the input circuit and corrective actions

Examples of errors that occur in the input circuit and corrective actions are explained below:

	Error status	Cause	Corrective action
Example 1	Input signals do not turn off.	• Activation via the LED display switch. 	• Connect a resistor so that the voltage between the input terminal and COM1 becomes lower than the OFF voltage.  * A calculation example used to obtain the resistance value to be connected is shown on the following page.
Example 2	Input signals do not turn off.	• Sneak path due to the use of two power supplies. 	• Reduce the number of power supplies from two to one. • Connect a diode to prevent sneak path. (as below) 

6 - 3

<Sample calculation for example 1>



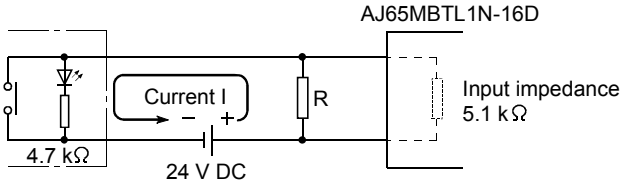
When a 2.45 mA leakage current flows due to a switch with LED indicator connected to the AJ65MBTL1N-16D.

- The voltage V_{TB} across the terminal and common is obtained by the following expression.

  V_{TB} = 2.45 [mA] × 5.1 [kΩ] = 12.5 [V]

  (The voltage drop across the LED is ignored.)

  Since this result does not satisfy the OFF voltage of 6 [V] or less, the input signal does not turn off. Hence, connect a resistor as shown below.



- Calculation of resistor R value

  Current I should be as follows so that the terminal voltage of the AJ65MBTL1N-16D is 6 [V] or less.

  (24 − 6 [V]) ÷ 4.7 [kΩ] = 3.83 mA

  Therefore, connect a resistor R that will give a current I of 3.83 mA or more.

- Resistor R to be connected is as follows.

  $6\ [V] \div R > 3.83 - \frac{6\ [V]}{5.1\ [k\Omega]}$

  6 [V] ÷ R > 3.83 − 1.18 [mA]

  6 [V] ÷ 2.65 [mA] > R

  2.26 [kΩ] > R

  Assuming that resistor R is 2.2 kΩ, the power capacity W of the resistor when the switch turned on is as follows.

  W = (applied voltage)^2/R

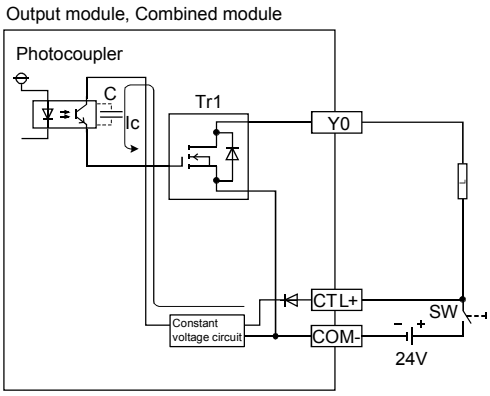
  W = (26.4 [V])^2/2.2 [kΩ] = 0.32 [W]

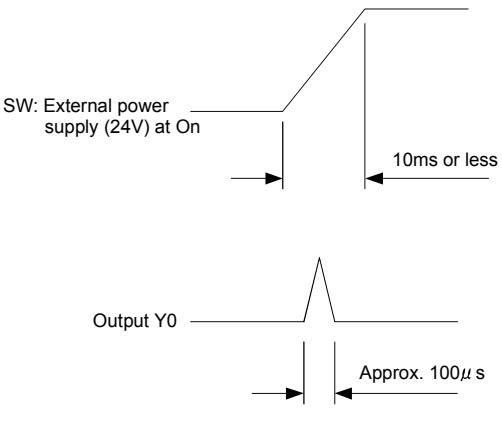
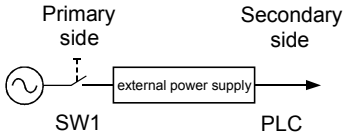
- The power capacity of the resistor is 1 to 2 [W] since a factor of 3 to 5 as compared to the actual power consumption is used to select the power capacity.

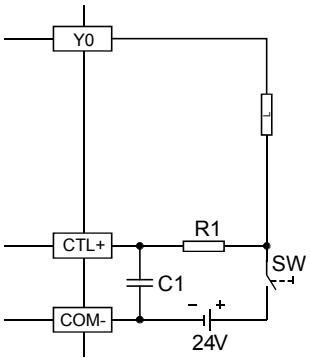
  Accordingly, connect a 2.2 [kΩ], 1 to 2 [W] resistor across the corresponding terminal and COM.

6.2.2 Errors occurring in the output circuit and corrective actions

Examples of errors that occur in the output circuit and corrective actions are explained below:

<table>
<tr><th></th><th>Condition</th><th>Cause</th><th>Corrective action</th></tr>
<tr><td>Example 1</td><td>Whegn the external power supply turns on, the load turns on for a moment.</td><td>Erroneous output due to the stray capacitance (C) between collector and emitter of hotocoupler.
(There is no erroneous output at normal road. An erroneous output may occur at high sensitivity load (such as solid state relay).)
 

If the external power supply is turned on precipitously, Ic urrent flows due to the stray capacitance (C) between collector and emitter of hotocoupler.
Ic current flows to the next stage of transister Tr1 gate and Y0 utput turns on by 100 s
 
</td><td>When the external power turns ON/OFF, check that the external power supply rising edge must be 10ms or more, and switch the SW1 to the primary side of external power supply.
 

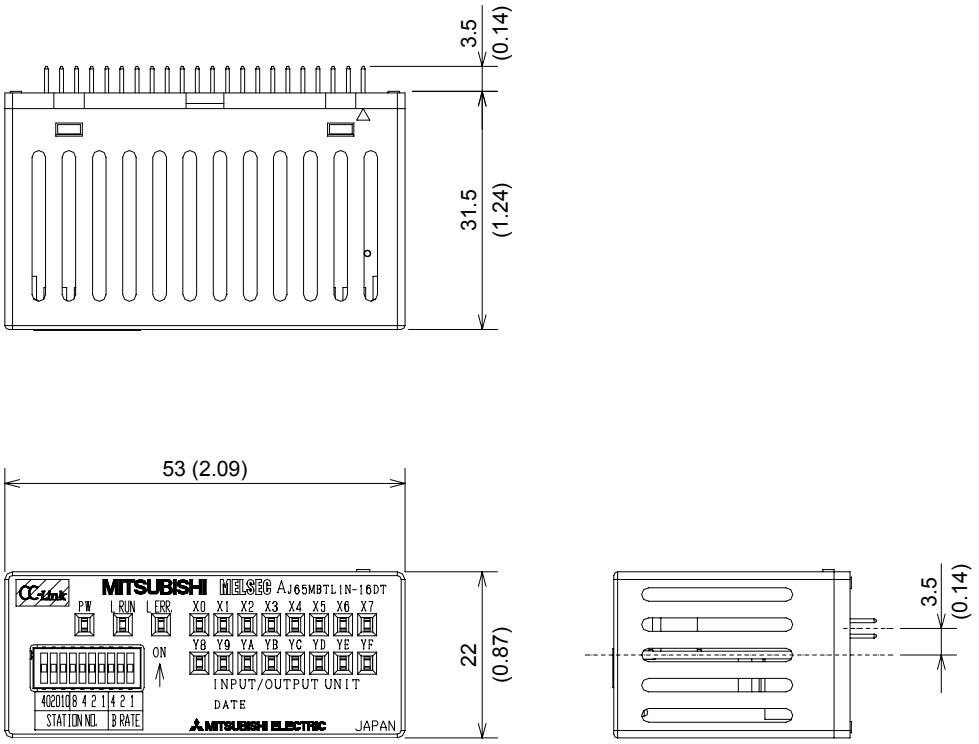
When switching to the secondary side of the external power supply is required, the external power supply rising edge connected a condenser must be slow, and measured 10ms or more.
 

R1: Several tens of ohms
Power capacity ≧ (external power supply current[*1]) [2] × resistance value × (3 to 5)[*2]
C1: Several hundreds of microfarads μF 50V
*1 Refer to consumption current of the external power supply for modules used in this manual.
*2 Select the power capacity of resistance to be 3 to 5 times lager than the actual power consumption.
(Example)
R1=40Ω , C1=300 μF
Use the below expression to calculated a time constant
C1 × R1=300 × 10^{-6} × 40
=12 × 10^{-3} s
=12ms</td></tr>
</table>

APPENDIX

Appendix 1 External Dimensions

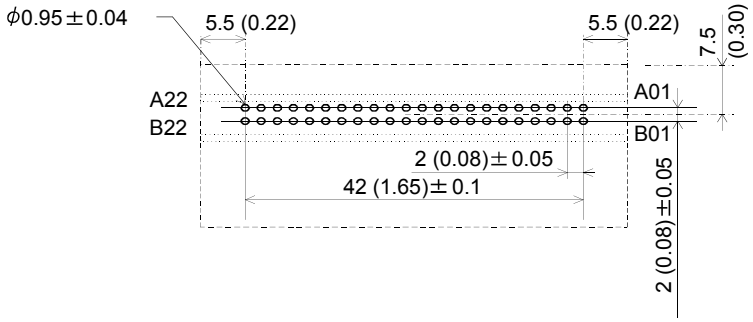
Appendix 1.1 AJ65MBTL1N-16□



Unit: mm (inch)

[Recommended board dimension drawing]

(top view)

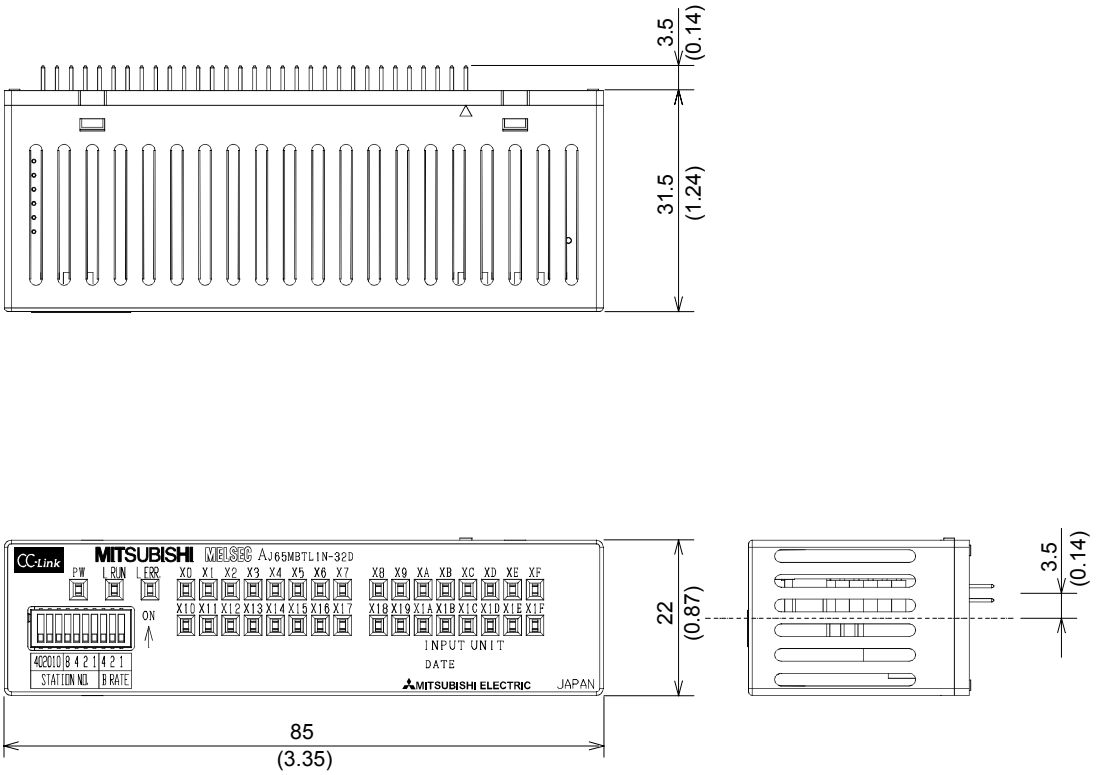


Unit: mm (inch)

APP

App - 1

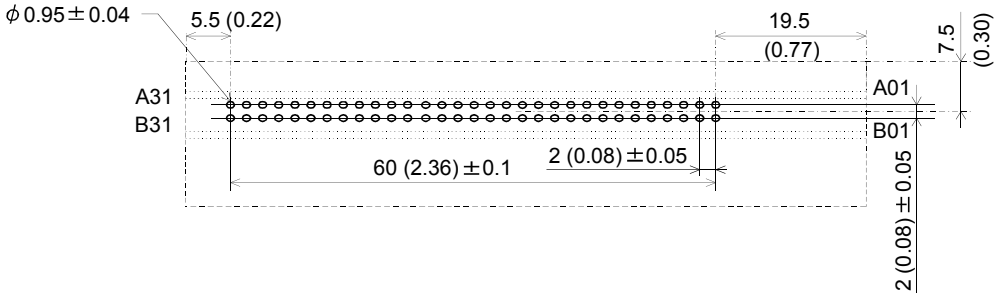
Appendix 1.2 AJ65MBTL1N-32□



Unit: mm (inch)

[Recommended board dimension drawing]

(top view)



Unit: mm (inch)

APP

App - 2

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
(2) The Mitsubishi programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable logic controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable logic controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

CC-Link Embedded I/O Adapter

User's Manual

MODEL	CC-LINK-M-I/O-U-E
MODEL CODE	13JR59
SH(NA)-080324E-D(0609)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.